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BEFORE THE

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Mr. Chairman, distinguished members of the Committee, it is my privilege to appear before this Subcommittee to testify on behalf of the Department of Transportation on one of the most exciting developments in transportation in recent years -- magnetically levitated high speed ground transportation or Maglev.

Congestion on our highways and at our airports is constraining intercity mobility to the point that economic growth may soon be adversely affected. Maglev, with very safe operating speeds in excess of 300 mph, offers the potential to dramatically improve surface transportation mobility using a technology that is energy-efficient and environmentally sound.

On more than one occasion, I have had the opportunity to ride in the prototype Transrapid maglev at Emsland in West Germany -- to glide through the German countryside at speeds in excess of 200 miles per hour. I have met with designers of this system and of the system under development in Japan. And I have met with State

and local officials and private developers who want to put up their own money to bring maglev to the United States. I have come away from those meetings with the belief that maglev has the potential to play a major role in this Nation's transportation system beginning in this decade and extending well into the next century.

Initial maglev systems are most likely to develop on a regional basis with distances up to 600 miles, absorbing excess highway and airline demand. High speed maglev systems, connecting regional airports as well as city centers, could provide an attractive alternative to short distance airline travel and could prove effective in relieving airport congestion. Regional maglev systems could ultimately expand to form a nationwide system.

There are basically two types of maglev systems being tested today. One works on the magnetic attraction principle where the vehicle underframe, which wraps around the guideway, is drawn up to within three-eighths of an inch of the bottom surface of the guideway. The German Transrapid system, now nearing the end of its prototype testing, is an example of the attraction technology. The other, the Japanese Railways' prototype, works on the magnetic repulsion principle, pushing the vehicle 4-6 inches above the guideway. As you know, much of the original research into maglev was conducted by the Federal Railroad

Administration (FRA). During FRA's period of active maglev research and development (R&D), Germany, Japan and other countries involved in maglev research shared the products of our efforts. We can see the embodiment of much of America's and DOT's own R&D developments in both the German and Japanese prototypes.

Although both the German and Japanese systems are in the full scale prototype testing stage, no high speed maglev system is presently in revenue service. The Germans have approved construction of a revenue service line to connect the Bonn/Cologne and Dusseldorf airports, a distance of approximately 50 miles. The Japanese, however, have decided to undertake further prototype testing. They are committing over \$2 billion to construct a 40-mile segment of maglev through a mountainous region southeast of Tokyo and to refine their vehicle. When testing is complete, this segment will be incorporated into a commercial maglev link between Tokyo and Osaka, which is scheduled to begin operation in approximately 10 years.

Both the Germans and Japanese have made impressive advances in developing this technology, but I believe that there is a potential for a U.S. designed, advanced maglev system that could become the system of choice for future high speed ground transportation systems. The task before us now is to determine the appropriate role of the Federal Government in this

development. Toward this objective we are participating in an Administration initiative to explore the possibility of stepped-up U.S. efforts in this important emerging technology. This initiative involves several Federal agencies working together to pursue a cooperative public-private partnership in a plan designed to facilitate private development of an operational maglev in the United States.

I would now like to focus on describing FRA's role in maglev development, what we have done, what we are doing, and what we believe should be done in the future. I will then address the specific questions contained in your letter inviting me to testify here today.

PAST DOT EFFORTS IN THE DEVELOPMENT OF MAGLEV

FRA's earliest involvement with maglev dates from the High Speed Ground Transportation Act of 1965. Under that Act, we funded a wide range of research into all forms of high speed ground transportation. FRA rapidly became a world leader in maglev research and along with the National Science Foundation sponsored research which produced scale model demonstrations of the maglev concept. Research by the FRA led to the development of the linear induction motor, the motive power used by all current maglev prototypes. In 1974, a prototype linear induction motor research vehicle set a world speed record of 255.4 m.p.h. at the Transportation Test Center in Pueblo, Colorado.

In recent years, FRA has funded feasibility studies by States considering high speed ground transportation systems and has been the catalyst for many efforts to define the potential for such systems, providing both seed money and technical assistance. Prominent among these are advanced projects proposed for Florida, Texas, Ohio, California/Nevada and Pennsylvania.

Finally, enactment of the Rail Safety Improvement Act of 1988 [45 U.S.C. 431(a)] specifically made FRA responsible for establishing and enforcing maglev safety standards. We have restarted our maglev research program to provide a basis for maglev safety standards.

THE CURRENT STATUS OF MAGLEV IN THE U.S.

A number of States have investigated the feasibility of high speed maglev systems, and some have concluded that private maglev systems are feasible. The Florida High Speed Rail Transportation Commission is in the second phase in its process for awarding a franchise to build and operate a maglev line between Orlando Airport and the nearby theme park area, approximately 14 miles away. This line, which could begin construction as early as next year, would employ the German technology and be financed by Japanese banks. Public and private interests in Pittsburgh recently announced plans for a detailed feasibility study of a 27 mile link between the city's downtown and its airport using

Transrapid Maglev and for developing maglev manufacturing activity in the Pittsburgh area. The Transrapid Maglev is likely to be a serious contender as the high speed ground transportation system to connect Las Vegas with the Los Angeles region.

CURRENT DOT MAGLEV-RELATED ACTIVITIES

As the agency responsible for the safety of maglev systems, the Department has initiated a major research and testing effort to ensure the safety of U.S. maglev systems. Research on the Transrapid system, the system proposed for the Florida project, is underway and is being accelerated to ensure that unresolved concerns with safety do not slow implementation. This work will evaluate the adequacy of this maglev system and the need for standards for operation in the U.S.

FRA's initial safety research focuses on Transrapid and attractive maglev technology because it has been formally proposed for implementation in the U.S., but we also intend to cover repulsive levitation technology as represented by the Japanese design. Our first priority in these efforts is safety, and we are working with the developers of the systems to ensure that FRA safety standards and regulations are clear and timely so that they may be considered in future system design. We want safety built into the systems.

The Department is also assisting the Florida officials and developers in exploring the environmental issues related to the proposed Florida Maglev project, and will serve as the lead agency for preparation of any Federally required environmental documentation.

The Department is exploring the use of existing transportation rights-of-way, such as the Interstate Highway System and freight rail lines. Preliminary assessments by the Federal Highway Administration have indicated that the location of maglev systems in Interstate Highway median strips may be technically feasible in certain corridors where not otherwise constrained by horizontal or vertical curvature limitations. We are continuing to explore this issue and will work with interested parties to develop mechanisms to expedite the requisite approvals where highway segments can be used in a project.

At the direction of the Congress' Appropriations Committees, FRA is conducting a preliminary study into the feasibility of commercial maglev in the U.S. That study, which will soon be delivered to Congress will provide an initial insight into maglev's market potential, the economic and technical feasibility of commercial maglev systems, and legislative and other institutional changes that would facilitate the development of U.S. maglev systems designed and manufactured in the United States.

While the study is nearing completion, the results are still being evaluated and, as a consequence, I cannot report on its specifics. I can say that we have not uncovered any "show stoppers" and that it is clear both current maglev systems are still in the formative stage with some bugs to be worked out, including sources for the rather substantial capital costs. This is a natural stage for any new technology, and it offers U.S. industry the opportunity to improve on the existing technology in this country.

FUTURE DOT MAGLEV ACTIVITIES

As you are no doubt aware, the President's budget request for Fiscal Year 1991 includes a request for approximately \$10 million to explore the possibility of stepped-up U.S. efforts in maglev: with \$6.5 million to FRA and \$3.5 million to the Corps of Engineers. Building on previous R&D and results of the ongoing FRA feasibility study and on the efforts of the Corps of Engineers and DOE, that program is designed to determine the appropriate role for maglev in the U.S. transportation system, the economic feasibility, the appropriate safety and operating standards, and the remaining technologies that must be developed to achieve an efficient, economically sound, and environmentally acceptable U.S. system. The goal of the program is to facilitate private development of an operational maglev system in the U.S.

and the potential for a domestically designed and manufactured technology.

To avoid possible duplication of efforts, last year Federal agencies with interests in maglev established a mechanism to coordinate their efforts. The Federal Maglev Executive Committee, which I have the privilege to co-chair, with Major General Pat Kelly of the Corps of Engineers, and includes J. Michael Davis, Assistant Secretary of Energy for Conservation and Renewable Energy and William G. Rosenberg, Assistant Administrator of the Environmental Protection Agency for Air and Radiation. The Department of Transportation's contingent on this Committee demonstrates both the potential importance of maglev and the Department's renewed efforts to view transportation intermodally. In addition to myself, the Executive Committee includes Jeffery Shane, Assistant Secretary of Transportation for Policy and International Affairs, Admiral James Busey, the Federal Aviation Administrator, Brian Clymer, the Urban Mass Transportation Administrator, and Thomas Larson, the Federal Highway Administrator.

The Committee will set policy for our coordinated maglev efforts, which we are calling the National Maglev Initiative. At the working level, the Federal Maglev Coordinating Committee is jointly chaired by FRA and the Corps directing implementation of the programs and coordinating all Federal maglev efforts. In

addition to the agencies represented on the Executive Committee, NASA and the Department of Commerce are participating in these efforts so that we can take advantage of their specialized expertise. We also expect to get input from the Surgeon General when we begin to address health related issues.

The process is working well. I believe combining the Department's expertise in transportation and in maglev technology with the expertise possessed by the other Federal agencies will lead to thorough analysis and useful recommendations on the future of maglev in the U.S. The recommendations, to be completed in early 1992, will lay out the potential for maglev and the steps by the government and the private sector necessary to realize this potential.

VIEWS ON H.R. 4549

In your letter inviting me to testify, you asked for my views on H.R. 4549, the Magnetic Levitation Transportation and Competitiveness Act of 1990. This bill would create a "Magnetic Levitation Transportation" Administration in the Department of Transportation and would authorize almost \$1 billion in Federal funding for a design competition that would lead to construction and testing of a maglev prototype.

While we support the development of U.S.-based maglev technology, we oppose some of the specifics of H.R. 4549. The program

proposed in the President's budget, which is taking shape as the National Maglev Initiative, is a prudent approach to the challenging, complex and expensive undertaking that will involve moving the United States to a position of leadership in maglev technology.

The design competition called for in H.R. 4549 is an interesting approach. Portions of the proposed National Maglev Initiative effort, specifically the conceptual system designs, are based on similar principles and a design competition may ultimately be the best way to proceed. But I believe that today this effort is premature and that any decisions on a more extensive maglev development program should wait until they can benefit from the activities that we have in the pipeline.

A major part of the National Maglev Initiative during fiscal year 1991 will be an expanded analysis of the transportation potential of maglev. This effort will address the inherent advantages and limitations of maglev to determine how maglev would best fit into the U.S. transportation system of the future, and determine what characteristics a specific maglev system should possess. For instance, today there are maglev advocates that foresee systems that resemble Amtrak's service on the Northeast Corridor with large capacity vehicles, making hourly trips with stops about 50 miles apart. There are others that see an entirely different system, with small vehicles and more

frequent and direct service to more destinations. We will be looking at these and other approaches to determine the nature of the systems that will best meet America's needs and that will be economically viable in the American marketplace. The results of these analyses should be a crucial element in the design process for any U.S.-based maglev system. Furthermore, the results will help build the level of confidence that the private sector has in the potential of maglev, and encourage them to invest their time and resources in the development of this technology.

Sections 4 and 5 of H.R. 4549 propose Federal grants totalling almost \$1 billion to conduct a design competition and develop a maglev prototype. A Federal program of this magnitude has not been justified. While the section-by-section of this bill recognizes that these funds may need to be supplemented from non-Federal sources, I believe that this misses the point. The private sector must be committed to maglev development for any program to be successful. We need their involvement. Not just because Federal resources are limited, which they are. But also because the private sector brings a different viewpoint to such enterprises -- a viewpoint more closely attuned to the commercial potential of the results of research and development efforts. I believe that under appropriate circumstances, the private sector will invest its resources in the development of maglev technology. The conceptual system design work that we propose to fund as part of the National Maglev Initiative will involve cost

sharing on the part of the teams undertaking this work. I would see this approach carried through in any follow-on research and development efforts with perhaps the Federal Government bearing a greater share of the "high-risk" research, but with the Federal Government's share of R&D funding declining as the relative risk declines.

Here again is another area where the National Maglev Initiative efforts proposed for next year will be of value to any effort to develop a U.S. based maglev system. We will be working with the companies and entrepreneurs who might play a role in maglev R&D to determine what conditions and commitments are necessary to attract private investment in research. Clearly one of the great uncertainties that works to keep industry on the sidelines is in the area of total costs involved in developing a U.S. based maglev technology. The maglev research and development cost estimates that have been batted around up to now are more "guesstimates" than estimates. We will work to develop an estimate in which both the Government and the private sector will have a high degree of confidence. From that vantage point, we can then engage in a meaningful debate on the appropriate level of Federal and private sector financial commitment to maglev R&D.

My final comments on H.R. 4549 have to do with the creation of a new modal administration in the Department of Transportation to deal exclusively with maglev. This provision is inconsistent

with the Department's National Transportation Policy and, in my opinion, would be a detriment to the goal of developing a U.S. based maglev technology, as well as efforts to develop specific maglev projects. The bill should acknowledge the significant roles of the other participating agencies, including the Corps of Engineers, DOE and EPA.

For too long the different modes of transportation have viewed themselves in isolation and not as part of an integrated national transportation network. Under the National Transportation Policy we are trying to change that. We are taking the intermodal view of transportation and I think the Department's maglev efforts to date bear witness to the fact that the old ways of doing things are changing. As I mentioned earlier, my counterparts representing highways, aviation, and urban mass transportation have joined together in helping to provide policy direction to the proposed maglev efforts. Recently FAA arranged a meeting where FAA and FRA met with officials of the Orlando International Airport, and of the developer proposing to build a maglev demonstration project in the Orlando area to address coordination of ground side access to the airport. In a similar vein, the FHWA is working with FRA to evaluate the potential use of existing highway rights-of-way for maglev systems. Maglev systems will not operate in isolation. Instead they will be part of tomorrow's integrated transportation systems. We have begun the efforts necessary to insure the intermodal coordination of maglev

and this provision of H.R. 4549 would act to "pigeonhole" maglev and would be a step backward.

The Department of Transportation is prepared to work with this and other interested committees and individual members of Congress to reach a consensus on how to proceed with maglev. This is an exciting challenge to undertake and I look forward to working with you to meet that challenge.

Mr. Chairman, this concludes my statement and I will be happy to answer any questions that the Subcommittee might have.